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A. GIGER

RETORT FOR DISTILLING CARBONACEOUS MATERIALS

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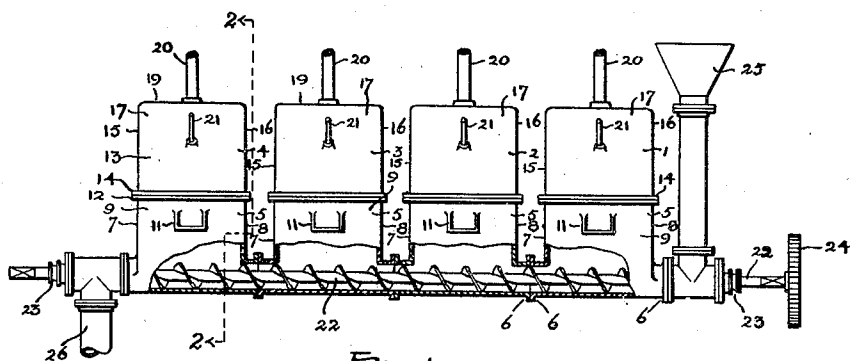


Fig. 1.

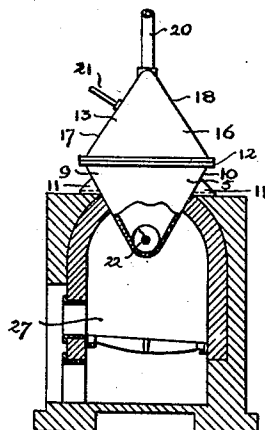


Fig. 2.

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RETORT FOR DISTILLING CARBONACEOUS MATERIALS.

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To all whom it may concern:

Be it known that I, ALBERT GIGER, a citizen of the United States, residing in the city of Vancouver, in the Province of British Columbia, Canada, have invented certain new and useful Improvements in Retorts for Distilling Carbonaceous Materials, of which the following is a specification.

My invention relates to an improvement in methods for distilling by-products from carbonaceous material and apparatus therefore, and the object of the invention is to devise quick means whereby all the by-products may be carried off by a continuous operation from carbonaceous material and so that such by-products will be drawn off in separate classes according as they are more or less volatile and to provide a simple apparatus by which the operation may be carried out, and consists essentially of a plurality of individual retort chambers arranged in a battery with a single feed device common to all, as will be more fully described in the following specification in which:—

Fig. 1 is a front view of my retort apparatus showing a cutaway portion to expose the feed mechanism.

Fig. 2 is a sectional view taken on the line 2—2.

In the drawings like characters of reference indicate corresponding parts in each figure.

The numerals 1, 2, 3 and 4 indicate in general, a plurality of retort chambers each of which consist of a lower casing 5 formed substantially V shaped in transverse section, see Fig. 2, having a circular coupling neck or flange connection 6 at the base of the V, a pair of vertical side walls 7 and 8, a front wall 9 and a rear wall 10. 11—11 are brackets upon the wall 9 and 10 for supporting each of the chambers 1, 2, 3 and 4 in suitable brickwork. 12 represents a horizontal flange at the upper edge of the walls 7, 8, 9 and 10 for the attachment of the upper casing 13 to the lower casing 5.

13 represents the upper casing of the chambers 1, 2, 3 and 4, which each consist of a flange 14, vertical side walls 15 and 16, sloping front wall 17 and a sloping rear wall 18, the walls 17 and 18 converge at their upper edges as at 19 to form a closure of the top of the casing 13. 20 are a plurality of pipes leading from the top of each

of the chambers 1, 2, 3 and 4 for the purpose of taking off the gases therefrom.

21 indicates a plurality of pyrometers, one of which is inserted through a wall in the upper casing 13 of each of the chambers 1, 2, 3 and 4, that the temperature therein may be under constant observation. 22 is a spiral conveyor shaft extending lengthwise of the base of each of the chambers 1, 2, 3 and 4 and through stuffing boxes 23 and is journaled in suitable bearings adjacent each end thereof. 24 indicates a gear wheel keyed to the shaft 22 by which, in conjunction with suitable power, the shaft 22 is rotated to continuously propel the material from the feed hopper 25 through the several chambers. In order to provide for the formation of a gas tight seal between the several retort chambers, the screw 22 is made of a diameter approximately equal to the inside diameter of the connecting necks 6 while the pitch of the screw is less than the inside length of the connecting neck between any two chambers with the result that the material passing from one chamber to another acts in conjunction with the screw and the surrounding wall of the neck coupling to establish the necessary gas tight seal intermediate the chambers between which the material is passing. In this way, the gases produced in one retort are positively prevented from mixing with gases in adjacent retorts.

25 is a hopper connected to the flange connection 6 of the first chamber by suitable fittings, through which the material to be treated is fed. 26 is a pipe through which the residue from the retort is discharged.

27 represents one of a plurality of furnaces, see Fig. 2, which is constructed of suitable brickwork and into the top of which the lower casing 5 of one of the chambers 1, 2, 3 or 4 project, there being one furnace for each of the several chambers that a substantial difference in temperature may be maintained in each of the chambers during all running periods.

Having thus described the principal parts of the apparatus by which my method is carried out, I will now briefly explain the operation of the distillation of various by-products from coal, though it will be readily understood that other hydro-carbons can be distilled with equal efficiency and in a similar manner.

The feed screw conveyor 22 is set in motion at a desired speed and coal is fed into the hopper 25 and on its reaching the screw it is carried across the base of retorts 1, 2, 3 and 4 maintaining a depth therein substantially equal to the diameter of the screw. The furnace under chamber 1 is maintained at a heat sufficient to produce a constant temperature in that chamber of 150 to 170 degrees centigrade, the small quantity of coal continually being submitted to this heat and at the same time being slowly agitated, becomes almost instantaneously heated to a temperature at which the lighter oils such as benzine, toluene, benzole, etc., are given off as a vapour, and pass outward through the pipe 20 for cooling and condensation to liquid form. The residue from chamber 1 passing to chamber 2 where a temperature of about 220 degrees is maintained, becomes quickly heated to that temperature, so that the oils such as carbolic, phenol and naphthaline are given off as vapour and pass outward of the retort.

Each successive chamber is maintained at a greater degree of heat than the preceding one and in consequence, gases of a different subclass are taken therefrom, each producing a less volatile gas and liquid than the previous one. By the use of my retort, material is being constantly fed from one chamber to another, each of which are of widely varying temperatures and as the quantity of material fed into and out of each chamber is of small and constant volume, it will be readily seen that the rise of temperature must be instantaneous and that no other gases can be given off in any one chamber excepting those required to form a desired subclass.

It will thus be apparent that my retort is continuous in operation and is capable of distilling by-products from hydro-carbon bases and of segregating such by-products into as many different subclasses as there are chambers to the retort, at the same time accomplishing this result in a highly satisfactory manner.

What I claim as my invention is:

1. A retort chamber for the distillation of carbonaceous materials comprising a pair

of side walls, front and rear walls converging together and connected at their lower edges, to form the bottom of the chamber, a pair of coupling necks extending outwardly from the said side walls and disposed with the lower portions thereof in the plane of the bottom wall of the chamber to form symmetrical extensions of said wall, a conveyor screw passing through said necks and engaging the bottom wall of the chamber, said screw being of a diameter approximately equal to the inside diameter of said necks and a gas collecting dome surmounting said walls and forming the top of the chamber.

2. A retort chamber according to claim 1, in which said gas collecting dome comprises a pair of end walls of inverted V-shape, a pair of sloping side walls converging together and connected along their upper edges to form the top of the dome, said side, front and rear walls of the dome being mounted upon and secured to the corresponding lower wall portions of the retort chamber to form continuations thereof.

3. A retort for the distillation of carbonaceous materials comprising a material receiving chamber including vertical side walls, front and rear walls converging together and connected at their lower edges to form the bottom of the said chamber, a continuous flange formed integral with the upper edges of said walls in combination with a vapor dome comprising vertical side walls, front and rear walls converging together and connected at their upper edges to form the top of the dome and a flange formed integral with the lower edges of the dome walls adapted to be secured to the first mentioned flange, said material receiving chamber being provided with inlet and outlet passages for the material and said dome being provided with an outlet for the gases evolved in the process of distillation.

Dated at Vancouver, B. C., this 7th day of June, 1922.

ALBERT GIGER.

Witnesses:

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